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TECHNOLOGY ASSE^SSEMENT OF DESKTOP PUBLISHING

(ASQBG-A-89-008)

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THIS REPORT HAS BEEN REVIEWED AND IS APPROVED

s/ 
James D. Gantt, Chief
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Systems Division


s/ 
John R. Mitchell
Director
AIRMICS

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TECHNOLOGY ASSESSMENT DESKTOP PUBLISHING

I. Historical Review

The desktop publishing technology is a relatively new technology. What has formally been done by page markup, either cut and paste or type-setting, can now be done by a single user at a workstation. The hand work, especially graphics, can almost be eliminated with current technology. The desktop publishing environment encompasses several technologies to include, word processing/text editing, graphics, document interchange, and printing. These technologies form the base for the generation and publishing of printed material. Desktop publishing technology can be discussed from the single user micro level to larger systems employing mainframe technology. Most current desktop publishing systems fall between these two realms, whereas past systems were almost always mainframe based. There are two supporting areas to desktop publishing that will also be examined in this assessment. Those areas are document interchange and printing. (ICR) ←

II. Currently Available

Desktop publishing is a growing area. Both leading companies for PC based desktop publishing, Ventura Publishing and Framemaker, are growing at over 100% per year. [1] Experts predict desktop publishing revenues to reach \$4.6 billion by 1992, up from \$128.7 million in 1988. [2] Every office can find a way to use the services offered by this technology. There are a number of vendors that offer systems that run on a variety of platforms, such as the Interleaf system that is capable of running on a UNIX-based workstation, an Apple Macintosh, or an IBM PC/clone. By far the most common systems in use today are those that run on a PC or workstation platform. Today's software requires a large memory requirement and therefore some upgrade is necessary to the large installed base of PCs. [3] Most of the packages available today can perform the functions of word processing, make graphics and incorporate the graphics into documents, scan objects, and print documents in a number of formats. However, most of these package are still only capable of working with small to mid-size documents. For most large (e.g. 800 - 900 page) documents, mainframes must still be used because of memory limitations. [4]

Printing has moved rapidly along with the desktop publishing technology. The wide use of laser printers capable of printing complex graphics has increased the use of desktop publishing at the user/office level.

The increased use has been due to the large number of applications that can now take advantage of laser printers and a significant decrease in laser printer cost. Most desktop laser printers cost approximately \$2000. This is compared to the average \$5000 cost just 3 years ago. [5] Laser printers are now capable of printing color documents. While the color printers remain a high cost item and are not widely available, this will change with expected cost reductions. Other recent developments include two-sided printing, increased graphics capabilities, and 400 dots per inch (dpi) resolutions.

A major shortfall of the desktop publishing systems today is the ability to transfer documents from one system to another. [1] Because of the wide variance between the different desktop publishing systems and some of the word processing packages that support or feed into desktop publishing, documents must be interchanged in a standard format. Currently, there is not a document formatting standard. Therefore, documents are transferred as an ASCII file, the lowest common interchange method, or as a Post Script file. While both methods work, neither is fully acceptable. ASCII allows for almost no special formatting while Post Script is only a defacto standard with some problems as Post these files are moved from one system to another. Vendors are now working on packages that provide automatic reformatting between different systems. Additionally, there is work on the Standard Generalized Markup Language (SGML) which will assist in the interchange. This will allow the special formatting characteristics, such as underline, boldface, and special fonts, and graphics to accompany documents as they are sent from one system to another. [6] Currently, Post Script has become the de facto standard to exchange files from various printers

Accompanying the document interchange is the growing use of scanners. This is another technology that has been available for several years, but has found a real usefulness with desktop publishing. Most scanners used today are reasonably priced (\$2000 - \$5000), but others with increased speed and capability are available at increased cost. [7] At the other end of the cost spectrum, "cheap" scanners are becoming available. Many of these are hand held and can satisfy the majority of small scanning needs, such as a graphic or letter head. Some scanners allow for the image scanned to be edited, while some scanners only allow for input with no editing. For those documents that do require changing/editing, the cost of the scanner that must be used is higher than the object scanners. A current limitation on scanners is printer technology. Printers are not always able to reproduce the resolution of the scanned image, this is especially true with photographs. New advancements in gray scaling and 400 dpi printers may help. The scanner technology will continue to grow as a method for placing previously published material in an

electronic form so that it can be incorporated into new documents. This will reduce the cost of document production and allow for the reuse of previously published material.

III. 1995 (Near Term)

By 1995, desktop publishing will take an ever increasing role in the office environment to the point of replacing many stand-alone word processors. Desktop publishing will become the central focus of the processing of documents and accomplish the processing faster and better. New desktop publishing systems will be able to combine multiple media into single documents. Unlike today's systems that require single files, the new systems will be able to easily combine text, graphics, and limited video images. [8] This will occur with the acceptance of document interchange standards. Although it is not envisioned as a single all encompassing standard at this time, there will be a number of common interchanges beyond the low level document interchange methods available today.

The acceptance of interchange standards will increase the number of documents that are printed remotely. (The Standard Generalized Markup Language (SGML) will be in place.) [9] Instead of sending a document, the document's electronic file will be sent. This will decrease the amount of document warehousing needed at printing facilities plus give the user/requester the option of storing the document in a printed (demand printing) or electronic form or both, if necessary. [10] [11] This will be the start of interactive manuals and reference material stored electronically, using multiple media. For example, a maintenance manual may contain a text explanation of the work, a graphic drawing of the parts to be used, and a video of how to replace the part. In 1995, this will be of use in a limited number of areas. The potential of this use of desktop publishing will be realized as an area of future growth.

Current print plants will still exist for the printing of large documents and documents that still must be centrally published. However, the traditional role of the print plant will start to change. Print plants will be incorporated more with the library science. As requests for documents are made, the print plant will have the ability to produce an electronic copy or printed copy to be forwarded to the user via electronic means or via standard mail. Libraries will start maintaining electronic files as reference material.

The desktop publishing systems will also be less stand alone and more of an integrated environment. Desktop publishing will be able to incorporate a standard database, spreadsheets, and other office tools. [8] The ability of the

office worker to use these systems will improve productivity. There will be a decline in the separate word processing and text editing systems, more work group publishing will occur. The work group may consist of a number of professionals that have an expertise in a given area; graphics, page design, text, etc. who will combine their efforts to produce a given document. Command driven text editors will also be on the decline by this time. The desktop publishing packages will also include a number of features not currently available, such as grammar and style checkers, more color capability, more slide-making and presentation capabilities. [7]

There will be an increase in the number laser printers. The cost of these printers will be down to the point where they will be as common as the impact printers of today. Office environments will be served by large, fairly sophisticated printers capable of handling multiple fonts, paper, and color. Like their smaller counterparts, these large printers will be reduced in cost.

There will be some hardware changes to include more full-page displays, color displays, and enhanced graphics. Resolution will be in the 600 dpi range which is double the 300 dpi available today. [12] The number and type of scanners will increase in use.

IV. 2010 (Long Term)

Desktop publishing as we know it today will not exist. The desktop publishing environment will be the office environment. The islands of office automation, publishing systems, database systems, records management, and document storage will be fully integrated. The desktop publishing system will be the method for combining various media into electronic, graphic, or symbolic images. These new "documents" will not resemble today's single file, but rather they will be only a listing of pointers and addresses to the information, how much information is required, and assembly instructions. Advances in distributed systems and hypermedia will make this possible.

Full document interchange will be possible through adopted standards that provide user-transparent facilities. These facilities will be able to transfer voice input to text and store the text in a hypermedia format that may be called and used by multiple systems.

The print plant functions will be totally combined with the library functions to provide a full service retrieval capability. Few if any documents will be sent by other than electronic means. Users will be able to store these documents electronically. Libraries of photographs and other images will exist for use by multiple users. Periodicals and other reference material may be

electronically forwarded automatically to user accounts. Users will not have to worry about having the latest edition of a regulation. This will drastically reduce the amount of paper being used. Articles could be electronically "clipped and filed" by users. This will lead to the creation of new periodicals that can combine articles from multiple sources based on subject area without human intervention. An example is the EARLYBIRD printed daily at the Pentagon. Sources, newspaper, magazines, etc., can be scanned electronically, often without human intervention, using key word or phrase searches. The results of the search can then be assembled and mailed/forwarded to the various offices of the Pentagon or major commands via electronic mail.

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